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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,288	10/17/2003	Ki-Don Lee	TI-34867	9183
23494	7590	07/07/2005	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			VORTMAN, ANATOLY	
			ART UNIT	PAPER NUMBER
			2835	

DATE MAILED: 07/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,288

Applicant(s)

LEE ET AL.

Examiner

Anatoly Vortman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12-14 and 16-20 is/are rejected.
- 7) ☒ Claim(s) 11 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the specification replete with typos and cumbersome language. For example, on p. 1, line 4 from the bottom of the page, “eletromigration (sic)” is recited instead of “electromigration”, in line 2 from the bottom of the page “in excessive” is recited instead of “in excess”, on p. 6, line 9 from the bottom of the page, “current carry metal” is recited instead of “current carrying metal”, on p. 8, line 8 from the top of the page, “ant level” (?) is recited, on p. 9, line 3 from the bottom of the page, the phrase: “The shape can be other than a straight line. (sic) extending and fabricated when the interconnect line is formed.” is recited, which is not understood, on page 10, lines 5 and 9 from the top of the page, the numeral “11” is used in reference to the “substrate”, wherein earlier in the specification and on the drawings, said substrate has a numeral “24”, etc.

All of the aforementioned problems are only the examples. The Applicant is advised to carefully review the entire specification in order to correct the aforementioned and similar problems in order to bring the specification in compliance with 35 USC 112, paragraph 1.

Claim Objections

2. Claims 1-20 are objected to because of the following informalities: the claims replete with typos and cumbersome language. For example:

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in claim 1, line 4 of the claim, “said an electrically” is recited and in line 5 of the claim “an extensions” is recited;

in claims 6 and 17, “said dummy metal structures is said dielectric region is between said... ” is recited. The phrase is cumbersome and unclear;

in claim 11, last two lines of the claim, “the electrically active connector” is recited instead of “the electrically active interconnect line”;

in claim 12, line 2 of the claim, “said electrically active conductor” is recited instead of “the electrically active interconnect line”;

in claim 13, line 5 of the claim, redundant “heat dissipating” is recited, line 6 of the claim, “a” is recited instead of “the” before “heat dissipating layer”, and in line 8 of the claim, “an” is recited instead of “the” before “extensions”.

The claims are lacking consistent terminology while referring to the same structural elements. The Applicant is advised to carefully review all of the claims in order to correct the aforementioned and similar problems.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 2-8, 12, and 16-20, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Regarding claims 2-8 and 12, the claims recite limitations: "heat dissipating layer(s)".

There is insufficient antecedent basis for these limitations in the claims. The limitations originally appear in claim 2, however they had never been positively set forth. It is not clear how said "heat dissipating layers" interrelate with the remaining structure.

Regarding claim 12, the claim recites: "said substrate", there is also insufficient antecedent basis for this limitation in the claim.

Regarding claims 16-20, claims 16 and 18-20 recite: "said dielectric region" there is also insufficient antecedent basis for these limitations in the claims.

The aforementioned antecedent problems have stemmed from the inconsistency in terminology discussed earlier.

The Applicant is advised to carefully review all of the claims in order to correct the aforementioned and remaining antecedent problems.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3, 5-10, 13, 14, and 16-20, are rejected under 35 U.S.C. 102(b) as being anticipated by US/6242807 to Kazami.

Regarding claim 13, 14, and 16, as best understood, Kazami disclosed (Fig. 1) an integrated circuit, comprising: an electrically active interconnect line (2) within a dielectric layer (not numbered) having a top and a bottom surface, the bottom surface of the dielectric layer being coupled to the top surface of a heat dissipating substrate (9) underlying the dielectric layer; said dielectric layer having horizontally arranged heat dissipating layers (5B, 5D, 5F, 5H) (dummy metal structures) and an electrically inactive conductors (vias) (5A, 5C, 5E, 5G, 5I) within said dielectric layer at a heat dissipating layers closer to the substrate (9) than said active interconnect line (2); said electrically inactive conductors (5A, 5C, 5E, 5G, 5I) coupled to said electrically active interconnect line (2) as an extension of the electrically active interconnect line (2) to dissipate heat therefrom (column 3, lines 15-28).

Regarding claim 17, as best understood, Kazami disclosed (Fig. 1) that the dummy metal structures (5B, 5D, 5F, 5H) are in said dielectric layer between the electrically inactive conductor (5I) and said substrate (9).

Regarding claim 18-20, as best understood, Kazami disclosed (Fig. 1) means (5A) (via) for coupling of said heat dissipating substrate (9) to a heat sink (5) (heat dissipating layers (5B, 5D, 5F, 5H) and inactive conductors (5A, 5C, 5E, 5G, 5I) together form a heat sinking structure (5) (column 3, lines 19+)).

Regarding method claims 1-3 and 5-10, as best understood, the method steps recited in the claims are inherently necessitated by the device structure as disclosed by Kazami.

7. Alternatively, claims 1, 2, and 13, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by US/5896271 to Jensen et al., (Jensen).

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Regarding claim 13, Jensen disclosed (Fig. 4) an integrated circuit, comprising: an electrically active interconnect line (20) within a dielectric layer (24-26, 40) having a top and a bottom surface, the bottom surface of the dielectric layer (24-26, 40) being coupled to the top surface of a substrate (12) underlying the dielectric layer (24-26, 40); said dielectric layer (24-26, 40) having horizontally arranged heat dissipating layers (24, 25, 26, 40) (they all inherently will dissipate heat) and an electrically inactive conductor (14) within said dielectric layer (24-26, 40) at a heat dissipating layer (40) closer to the substrate (12) than said active interconnect line (20); said electrically inactive conductor (14) coupled to said electrically active interconnect line (20) as an extension of the electrically active interconnect line (20) to dissipate heat therefrom.

Regarding method claims 1, 2, and 10, the method steps recited in the claims are inherently necessitated by the device structure as disclosed by Jensen.

Allowable Subject Matter

8. Claims 11 and 15, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 4 and 12 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

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regarding claims 11 and 12, parent claim 11 recites: "inactive conductor is in the shape of an H"; and,

regarding claims 4 and 15, the claims recite: "conducting pad".

The aforementioned limitations in combination with all remaining limitations of the respective claims, are believed to render the claims patentable over the art of record.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure:

US/5338967, 5698897, 6100199, 6265771, 6284574, 6570247, 6657864, 5792677, and 5621616 disclosed semiconductor packages and integrated circuits having thermal management arrangements.


11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anatoly Vortman whose telephone number is 571-272-2047. The examiner can normally be reached on Monday-Friday, between 10:00 am and 6:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Lynn Feild can be reached on 571-272-2092. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anatoly Vortman
Primary Examiner
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A handwritten signature in black ink, appearing to read 'A. Vortman', followed by a long horizontal line extending to the right.

AV